

CLAIMS

1. A chromatographic separator comprising an endless loop path including four or more columns each having an inlet port and an outlet port, said loop path being formed by coupling said outlet port of one of said columns to said inlet port of a succeeding one of said columns, said chromatographic separator having a function of extracting first and second components from a feed liquid material including therein two or more components while injecting said feed liquid material and a liquid eluent into said loop path, said chromatographic separator operating for: a circulation step of circulating liquid in said loop path; an extraction step of extracting said first or second component while injecting said feed liquid material or liquid eluent; and a flow-path switching step of sequentially switching an injection port for said feed liquid material, an injection port for said liquid eluent, an extracting position for said first component, and extracting position for said second component in said loop path to a downstream side of said loop path, characterized by:
- a density detector, connected to said loop path in a vicinity of said extracting position for said first component, to sequentially or repeatedly detect a component density of said liquid in said loop path during said circulation step;
 - a comparator for comparing said component density against a reference density, and

a process controller for shifting from said circulation step to said extraction step if said comparator detects that said component density is higher than said reference density.

5 2. The chromatographic separator according to claim 1, wherein said extraction step comprises a second-component extraction step of extracting said second component while injecting said liquid eluent; a first-component extraction step of extracting said first component while injecting said liquid eluent;
10 and another first-component extraction step of extracting said first component while injecting said feed liquid material.

3. The chromatographic separator according to claim 2, further comprising a timer for measuring a time interval between a start
15 time of said circulation step and a time instant when said circulation step is shifted to said extraction step, wherein said process controller determines a time length of one or more extraction steps based on said time interval measured by said timer.

20 4. The chromatographic separator according to any one of claims 1 to 3, wherein said reference density is switched at least between an initial reference density set for a start of operation of said chromatographic separator and a normal reference density set
25 for a steady operation of said chromatographic separator.

5 5. The chromatographic separator according to any one of claims 1 to 4, wherein said density detector is located in a vicinity of said extracting position for said first component on an upstream side thereof, and wherein said chromatographic separator further operating, subsequent to said flow-path switching step, for a remaining-liquid discharge step of discharging the liquid remaining in said density detector through said extracting position for said first component.